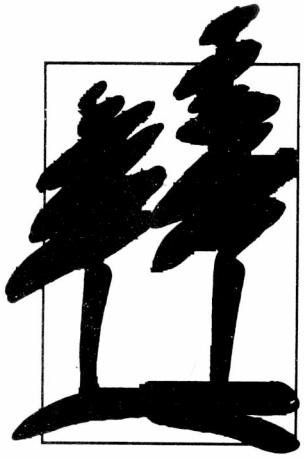

Nature matters

the AQD Museum and Biodiversity Garden, and the Environment Action Group

Nature parks for environment education and biodiversity conservation in the Philippines

By Teodora Bagarinao, PhD
AQD Scientist and Museum Curator

The incorporation of environment education within the formal system is advancing in the Philippines and the rest of Asia, but is still relatively underdeveloped and far from achieving its holistic and interdisciplinary objectives. Non-formal environment education through various recreational activities, such as visiting nature parks and biodiversity exhibits, can be effective means towards the 'greening' of the hearts, the minds, and the spirit of the citizens. Awareness of the natural heritage generates pride and curiosity; visits and first-hand experience generate awe, pleasure, and hopefully, protectiveness towards nature. The Philippines already has many protected areas, some of which can be used as nature parks. But the Philippines must invest more in the environment education of its people by adequately funding and properly managing these nature parks and other protected areas.

National parks, reserves, and other protected areas

National parks, as defined by the International Union for the Conservation of Nature and Natural Resources (IUCN), are relatively large natural areas not materially altered by human activity, where extractive resource uses are not allowed, and which are established to protect outstanding natural and scenic areas of national or international significance for scientific, educational, and recreational uses. The American government in the Philippines established forest reserves as early as 1910 and Governor-General Theodore Roosevelt declared Mt. Makiling in southern Luzon as the first national park in 1933. An extinct volcano 1,050 m high, Mt. Makiling is the most accessible natural forest from Manila and the best studied forest ecosystem in the country, thanks to the students and scientists at the University of the Philippines-Los Baños. By the 1980s, the Philippines had 65 'national parks', including ten merely historical sites with no biological or ecological significance. The rationale and criteria for selection of national parks were not clearly defined and many did not meet IUCN standards.

By 1990, there were 233 areas 'protected' under the categories national parks, game refuges and bird sanctuaries, wilderness areas, and municipal and barangay forest parks, but most of these had no management plans nor enforcement of regulations. After some rationalization, 116 protected areas were identified under the National Integrated Protected Areas System (NIPAS) when the NIPAS Law was passed in 1992. Ten priority sites (Table 1) were selected in terms of high biodiversity and ease of management, and for these, plans were drawn up for immediate implementation. Another ten sites of next priority were also lined up provided funds became available. The objective of the NIPAS is not only to protect the remaining areas of high biodiversity in the Philippines, but also to zone these into protected cores and multiple-use surroundings where resources are managed on a sustainable basis by the local communities.

Many national parks have been exploited rather than protected. Geothermal power is extracted in Tiwi Hot Springs in Albay, Tongonan Hot Springs in Leyte, and Mt. Apo in Davao-Cotabato. Logging was rampant in Bicol National Park, marble is mined in Biak-na-bato National Park, and milkfish pens have proliferated in the Hundred Islands National Marine Park. These and other alterations of the natural landscape by road construction, damming of water courses, or excavation, directly violate the fundamental concept of national parks. Past and present efforts towards proper management of national parks have been hampered by various land-use conflicts, and lack of political will, funds, trained personnel, and scientific research.

Some national parks have long been popular in tourism and thus accessible to Filipinos and foreigners, for example, Mayon Volcano, Pagsanjan Falls, Taal Lake-Volcano, and Mt. Makiling. Postcards, posters, tourist brochures, newspaper and magazine articles, and some books are available about the more popular destinations. Treks and camp-outs in Mt. Makiling can be arranged through the Makiling Conservation Foundation, which publishes information sheets about the mountain and its natural history. Well-established tourist services ferry people to and from Pagsanjan and Taal, but neither these nor the hotels bother to provide information about the geology and natural history of these areas. Already, much can be learned and disseminated from Dr. Thomas Hargrove's intriguing book about Taal Lake-Volcano and its freshwater-adapted sea life, including the sardine *Harengula tawilis*, the 'maliputo' jack *Caranx ignobilis*, the sea snake *Hydrophis semperi*, and a sponge.

The internationally known Banawe Rice Terraces (up to 1,500 m high and

☞

PNOC's Pook Kalikasan (at 1,300 meters above sea level), and Lake Agco (at 1,200 m) on Mt Apo in southern Philippines.

TABLE 1 The ten priority sites and the next ten proposed sites for establishment and management under the National Integrated Protected Areas System

Protected area	Location	Category
Batanes Islands	north off Luzon	protected seascape and landscape
Northern Sierra Madre	northeast Luzon	natural park
Mangyan Heritage	Mindoro	natural park
Apo Reef	Mindoro	marine natural park
Mt. Canlaon National Park	Negros	natural Park
Siargao Island	northeast Mindanao	wildlife sanctuary
Agusan Marsh	eastern Mindanao	wildlife sanctuary
Mt. Kitanglad	central Mindanao	natural park
Mt. Apo National Park	southern Mindanao	natural park
Turtle Islands	Sulu Sea	marine natural park
Mt. Pulog	north central Luzon	
Subic-Bataan National Park	western Luzon	
Bicol National Park	southern Luzon	
Mt. Isarog National Park	southeastern Luzon	
Bulusan Lake	southeastern Luzon	
Malampaya Sound	western Palawan	
Coron Island	north off Palawan	
Taklong Island	south off Guimaras	marine reserve
Rajah Sikatuna National Park	Cebu	
Mt Malindang	northwestern Mindanao	

2,000 years old) have not been declared a national park despite its cultural and biological significance. Thankfully, the Ifugao rice terraces, including those in Banawe, have recently been declared a UNESCO World Heritage Site. Protection is urgently needed as the rice terraces are eroded and Banawe town and Viewpoint 4 km away are 'uglified' by tourist commerce. The less visited rice terraces in Batad are in better shape.

Mindoro Island has many natural wonders to offer. Naujan Lake, the third largest lake in the country, is a national park and the type locality of the endemic *Crocodylus mindorensis* and the carp *Puntius hemictenus*. It is also an important staging and wintering area for large numbers of ducks and other water birds, and has a high diversity of migratory fishes important to fisheries. Puerto Galera, which had good coral reefs and beaches was declared a Man and the Biosphere Reserve, but tourism has taken its toll. Apo Reef and the Mangyan Heritage Park are now priority NIPAS sites (Table 1).

Palawan province may be the best ecotourism destination in the Philippines today. The whole of Palawan island was gazetted as a game refuge and wildlife sanctuary in 1967, as a mangrove swamp forest reserve in 1981, as a flora and fauna and watershed reservation in 1982, and also

☞ page 26

Nature matters / from p 9

as a Man and Biosphere Reserve. Lake Manguao, the only lake in Palawan has three endemic species of fish and is surrounded by high-quality monsoonal forest. Main attractions include the St. Paul Subterranean River, El Nido Marine Reserve, Calauit Island and Ursula Island game refuges and bird sanctuaries, and Ulugan Bay and Malampaya Sound with their old-growth mangrove forests.

The Tubbataha Reef National Marine Park in the middle of the Sulu Sea has become a favorite dive site and has been declared a UNESCO World Heritage Site. The marine biodiversity at Tubbataha is fast becoming well known, but not as fast as management problems have set in. Tubbataha has some of the best coral reefs remaining in the Philippines; most of the reefs elsewhere have been degraded by siltation, destructive fishing, and tourism.

Many other national parks are unknown or hardly accessible to the average Filipino and do not now contribute to recreation, environment education, science, nor livelihood through ecotourism. The Callao Caves in Cagayan, Libmanan Caves in Camarines Sur, and the Sohoton Natural Bridge in Samar all need some studies, protection, and advertizing as national parks and spelunking sites. Bulusan Lake and Volcano, Mt. Isarog, and Bicol National Park (a lowland forest) are not as well known as their neighbors Mayon Volcano or Tiwi Hot Springs. Nearby are Lakes Buhi, Bato, and Manapao, which are home to the endemic 'sinarapan' goby *Mistichthys luzonensis*. At 1.2 cm adult size, 'sinarapan' is the world's smallest commercial fish and is threatened due to overfishing and predation by the introduced tilapia. There is also hardly any information about the national park in Iloilo, the three in Cebu, the four in Leyte, nor those in Mindanao, except a few.

Mt. Apo (3,143 m high and the highest in the country) is the most popular national park in Mindanao, but there is no visitors' center where people can be briefed about the significance of the park and its ecosystems. The Kidapawan Tourism Council registers climbers at the Kidapawan Museum, whose main display is a model of the 701-hectare concession of the Philippine National Oil Company (PNOC) on Mt. Apo. PNOC maintains *Pook Kalikasan*, a visitors' center with a tree nursery, a botanical garden, a tribal livelihood training center, and the near-boiling Lake Agco (at 1,200 m elevation) nearby. Between Lake Agco and the Mt. Apo peak is three days' trek through forests, meadows, hot and cold springs, and around waterfalls and crater lakes. Scientific expeditions have found very high biodiversity on Mt. Apo. For example, Fr. Enrique Schoenig and other biologists from the University of San Carlos collected in 1974 more than 390 species of plants along with 337 species of insects, including 40 species of mosquitoes.

Initao National Park and Malindang National Park are not well known nor visited and only recently have efforts been made to document biodiversity in these and three other new protected areas in northern Mindanao. These parks have no amenities for the public, except some trails, and they all suffer from habitat destruction, logging, hunting, and encroachment of squatters. Agusan Marsh and Liguasan Marsh have some of the last remaining large populations of endangered wildlife, including *Crocodylus porosus* and *C. mindorensis*. Liguasan Marsh was declared a game refuge and bird sanctuary in 1941 and has stayed relatively pristine. The peace and order situation in Cotabato has not been stable.

Lanao Lake (second largest in the country) is not a national park, but nearby Sacred Mountain and five other locations in Lanao del Sur were declared national parks in 1965. Lanao Lake is the lifeblood of about a million Muslim Maranaos dependent on it and the surrounding watershed for water, fish, rice, livelihood, transportation, and cultural and religious identity. Unstable political relations with the Christians have been aggravated by the use of Lanao Lake and Agus River for megahydropower. Maria Cristina Falls downstream can now be seen only by appointment and only in half its glory because of the hydropower operations, but the area around it is well preserved like a park. Lanao Lake used to have a very diverse endemic fish fauna: 13 species of *Puntius* (= *Barbodes* or *Barbus*), and five species in four new genera of Cyprinidae. Of these 18 endemic carps, only the 'tumaginting' *Puntius sirang* can be fished at the present time; the others went extinct in the 1970-80s due to competition and predation by introduced fishes such as the white goby *Glossogobius giurus*.

Several marine parks and sanctuaries have been established through the efforts of universities. Dr. Angel Alcala of Silliman University pioneered this work in Sumilon Island and extended it to Pamilacan, Balicasag, Apo, and similar island reefs in the Visayas. The Taklong National Marine Reserve in Guimaras, declared in 1990, started out as a marine field station of the University of the Philippines-Visayas. Indeed, research in biodiversity and resource management in protected areas is often done by state colleges and universities with support from international funding agencies and private foundations. For example, Isabela State University, Conservation International, and Biodiversity Conservation Network work in the Palanan Wilderness Area, now called the Northern Sierra Madre Natural Park.

The Protected Areas and Wildlife Bureau (PAWB) of the DENR is responsible for the management, protection, sustainable development, and rehabilitation of protected areas to ensure the conservation of biodiversity for national economic and social development. PAWB collaborates with non-government organizations in many aspects of environment education and wildlife conservation. PAWB and the Asian Wetlands Bureau worked for the establishment of the Olango Island Wildlife Reserve, an important staging area for migratory shorebirds, particularly the endan-

☞

gered Asian dowitcher *Limnodromus semipalmatus*. Under the Debt-for-Nature-Swap Program, PAWB, the World Wildlife Fund, and the Haribon Foundation manage the El Nido Marine Reserve and St. Paul Subterranean River National Park in Palawan and the Mt. Pulog National Park in northern Luzon.

Urban parks and plazas

Biodiversity in urban areas must be protected for both utilitarian and aesthetic reasons: shade, cooling, noise abatement, pollution control, and architecture. The great parks and natural areas of the world's major cities, such as Central Park in New York City and the Golden Gate Park in San Francisco, provide opportunities for recreation, relaxation, and education, as well as habitats for a wide variety of species. Less grand but also important, the Luneta National Park in Manila and the Ninoy Aquino Parks and Wildlife Nature Center and Quezon Memorial Circle provide millions of Metro Manilans respite from an overcrowded polluted existence.

Nayong Pilipino near the Manila international airport is mostly an architectural and cultural display, but also has an aviary, aquarium, fishing lagoon, and a diverse plant collection. Nayong Pilipino is a good concept and a potentially stimulating urban park, but the commercial activity in the regional house replicas has not been regulated and several houses have degenerated into shabby shops and eateries. Instead of just selling souvenirs and food, the house replicas had better feature exhibits and descriptions of human life and the natural ecosystems in the different regions of the country. Funding can come from entrance fees, which will increase when more visitors come for educational and entertaining treats other than cheap

page 30

Training needs / from p 6

ents from each country varied in terms of priority short-term training needs. Highest priority was given a value of 10 and lowest, 1. Short-term training is defined as that which requires "hands-on" training with a duration of 2 months or less.

The results of the survey indicate that all short-term training courses offered by AQD were given high priority. In addition, training courses on aquaculture research and extension methodologies, integrated and intensive farming systems, management of aquatic resources and the environment, aquaculture economics and fish genetics were also deemed important.

In the Philippines, the survey indicates that brackishwater aquaculture for fish and crustaceans has the highest demand until year 2000. This is followed by freshwater aquaculture, aquaculture management, and fish health management. There is also a need for short-term training on aquaculture research methodology, culture of natural

page 28

TABLE 3 Ranking of priority short-term training needs

	PHIL	MALAY	SING	THAI	INDO	INDIA	CHINA	SRI	HK	CAM	NEPAL
Brackishwater Aquaculture	1		4	10	2	1		1	10	2	
Freshwater Aquaculture	2		4	7	6	8		2	9		2
Aquaculture Management	2	1	2	4	5	7	5	3	3	1	4
Fish Health Management	3	1	3	5	3	3	1	4	1	3	1
Aquaculture Research Methodology	4	1	4	3	9				8	2	4
Culture of Natural Food Organisms	5	1	3	2	4	7				2	3
Fish Nutrition	6		3	1	3	6	5	8	2	3	5
Marine Fish Hatchery	7		2	3	1	2	1	7	7		
Shrimp Hatchery Operations	7		5	6	7	4		6			
Aquaculture Extension Methodology	7		4	9		10		5	5	1	6
Integrated Fish Farming	8				10			9		1	
Fry Collection, Handling & Storage	9		5	9					4		
Sanitation and Culture of Tropical Bivalves			5	6	6	9			6		
Artemia Culture	10		3	8	8	5		10			
Management of Aquatic Resources & the Environment		1									7
Intensive Farming System			1								
Aquaculture Economics			2								
Fish Genetics			3								

jump page

Nature matters / from p 27

handicraft items. The people manning the house replicas have to be well-trained tour guides knowledgeable about the regional cultures and ecosystems.

Damaged urban ecosystems such as Manila Bay, Pasig River, and Laguna de Bay can be changed from ecological liabilities to assets that are useful for both increasing diversity and protecting natural systems. Information campaigns must accompany ongoing rehabilitation efforts and continue thereafter. Part of this campaign can be launched in nature parks and plazas in Metro Manila as well as on television (where, for example, the 'Piso para sa Pasig' ad is quite effective) .

Plazas adjacent to churches and government centers are found in every city and town in the Philippines. Many plazas already have beautiful gardens, but others still have lifeless concrete. Local governments and sectoral organizations had better operate their plazas as nature parks, where human activities (basketball, dances, others) are balanced with the provision of space for plants and wildlife and for educating people about nature and the environment.

Many Filipinos now spend a lot of time in glitzy shopping malls, partly for lack of good alternatives in terms of nature recreation. If some of the time and money can be diverted to nature recreation from 'malling', gambling, and even drinking and smoking, then young people may grow to become nature-conscious citizens with the hearts and minds to act for the environment.

Note

Full citations / references are given in the original paper that has been accepted for publication in **Ambio** entitled *Nature parks, museums, gardens, and zoos for biodiversity conservation and environment education in the Philippines.*